

PATENT SPECIFICATION

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812,980



Date of filing Complete Specification (under Section 3 (3) of the Patents Act, 1949): May 1, 1957.

Application Date: May 2, 1956.

No. 13528/56.

Application Date: Dec. 5, 1956.

No. 37161/56.

(Patent of Addition to No. 742,804 dated Feb. 19, 1954).

Complete Specification Published: May 6, 1959.

Index at acceptance:—Class 39(2), E1.

International Classification:—F21b.

COMPLETE SPECIFICATION

Improvements in and relating to Electric Battery Lamps

We, B. M. LAMPS LIMITED, of 7, Brunswick Place, Southampton, a British Joint Stock Company, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed to be particularly described in and by the following statement:—

This invention relates to electric battery lamps of the self-contained type.

In our prior Specification 742,804, we have described an electric battery lamp, comprising a casing having a closed end and an outwardly flared open end with a flanged rim, the casing being provided at its open end with a rim-fitted metal reflector including a bulb-holder, in which a removable ring or collar made of rubber or like resilient material holds the rims of the casing and reflector towards one another while preventing direct contact between them and permitting their partial relative rotation to effect switching of the lamp circuit.

The present invention consists of an improved electric battery lamp in which a bulb-holding reflector, which is partially rotatable in relation to the casing by means of a ring or collar to effect switching of the lamp circuit, as in our aforesaid Specification, is also movable axially or by tilting in relation to the casing in order to provide for intermittent illumination of the lamp, by bringing the rim of the reflector into contact with the open end of the casing. In order to avoid accidental closing of the lamp circuit by axial or tilting movement of the reflector, for example when the lamp is stowed out of use, there may be provided an additional position in the rotary movement of the reflector, at which position it will be locked against axial or tilting movement.

The resilient rubber ring or collar holding the reflector and casing together may conveniently be provided with one or two internal annular grooves in which the rims of the reflector and of a front glass or the like are engaged,

the ring or collar fitting around the open end of the casing by means of a cylindrical flange formed integral with the ring or collar. With this flange engaging sufficiently tightly to exclude damp, water and dust under normal conditions, the fitting of the ring or collar or the axial movement of the reflector for intermittent illumination of the lamp is liable to set up a slight compression of the air enclosed in the lamp casing, sufficient to lift the flange from engagement, with consequent escape of air; the return of the reflector to normal position will then produce a slight vacuum inside the casing, which may draw in damp air or even suck in water or dust, if subjected to such conditions.

The invention therefore also provides for means to prevent such escape of air and consequent partial vacuum, even to the extent of retaining a slight pressure of air inside the lamp casing, so as to eliminate the risk of damp water or dust being introduced into the lamp. The invention is hereinafter described with reference to the accompanying drawings, in which:—

Fig. 1 is an elevation, in half section, of an electric battery lamp in the "on" position.

Fig. 2 is an enlarged detail showing the parts in the "off" position, after partial relative rotation of the reflector and casing.

Fig. 3 is a similar view showing the parts in the "on" position, after axial movement of the reflector in relation to the casing.

Fig. 4 is a similar detail view showing the parts in the locked "off" position.

Fig. 5 is an end view of the lamp casing, as seen from the left of Fig. 1, the collar, front glass and reflector being removed.

Fig. 6 is a rear view of a carrier ring for three insulating pads, and Fig. 7 shows one of these pads removed.

Fig. 8 is a sectional elevation of the reflector.

Figs. 9 and 10 are sectional elevations of contact members normally attached to the reflector.

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Fig. 11 is an end view of the reflector, as seen from the right of Fig. 8, with these contact members attached.

Fig. 12 is an elevation, in part section, of a safety ring fitted to the lamp.

Referring to Fig. 1, the lamp body, which may consist of an aluminium-alloy casting, comprises a cylindrical portion 10 forming a casing for the battery or batteries 11, closed at one end 12 and open at the other end, the latter being flared outwardly as at 13 to provide a cylindrical extension 14 of larger diameter. Within the flaring portion 13 of the body, there are provided three evenly spaced lugs 15, beyond which the extension 14 is bored out to form a shoulder 16. A metal ring 17 of angle-section is fitted tightly into the extension 14 and against the shoulder 16, being secured by any conventional means, the inner flange of this ring is divided, as seen in Fig. 5, by three gaps 18 spaced evenly apart and located between the lugs 15, the back of this flange thus forming three arcuate ledges 19, each of which has a radial wall 20 at one end. Between these ledges and the lugs 15, there are fitted three insulating pads secured in place by adhesive or by pinning, each of these pads comprises an arcuate cheek 21 partly recessed into the face of the ledge and a shorter cheek 22 fitting against the lug 15, the two cheeks being made separate or connected together at one end of the ledge. The cheek 21 extends for about three-quarters of the angular length of the respective ledge 19, and its exposed face is divided by substantially radial humps into two sectors, the remaining portion of the ledge adjacent to the wall 20 being stepped up approximately flush with the end of this cheek.

The pad-carrier ring 17, which is fixed in relation to the lamp body, co-operates with a rotatable reflector or lamp head 23 for switching the lamp on and off by relative rotary movement, the reflector, shown separately in Figs. 8 and 11, comprises a central socket 24 for holding the lamp-bulb 25, which may be of screw type or push-in type, and it is provided with a flanged rim 26, having an inner flat face parallel with the outermost edge of the extension 14 at the open end of the lamp body. The reflector 23, including its socket 24 and its flanged rim 26, may be made in one piece of aluminium alloy, being preferably fitted with a polished metal liner 27, it is covered by a separate front glass 28. The reflector rim 26 and the front glass 28 are engaged in internal annular grooves 29, 30 respectively within a cap or collar 31 made of rubber or like resilient material, which is rotatable together with said rim and front glass in relation to the lamp body. The collar is formed with an approximately cylindrical flange 32, which fits around the extension 14, the flange 32 being relatively thin and terminating in a bead 33, the bead 33 being preferably circular in cross-section and slightly smaller

in diameter than the extension 14, upon which it therefore grips tightly to ensure water-tightness of the collar 31, without however preventing relative movement as required for switching the lamp on and off.

The reflector or lamp head 23 is provided with a contact member preferably made in the form of a spider 34 attached to the base 35 of the reflector, as by screws, and having three evenly spaced contact arms 36; these arms project beyond the circumference of the base to positions where they may co-operate with the carrier ring 17 for closing the lamp circuit or with the insulating pads on this ring for interrupting the circuit, the extremities of the arms being preferably bevelled on their edges.

As seen in Fig. 1, the contact arm 36 engages directly with the carrier ring, so as to close the circuit, all three contact arms being similarly engaged with the ring under the axial pressure of the spring 37 maintaining the batteries in engagement with the lamp 25; this pressure will be evenly distributed upon the three arms. Upon rotation of the reflector 23 by means of the rubber collar 31, for interrupting the lamp circuit, the arm 36 is moved from engagement with the ring 17 and brought onto the end of the cheek 21 of the insulating pad, as seen in Fig. 2, all three contact arms being similarly moved onto the insulating pads. In this position, however, the lamp may be brought back into operation, as for temporary or intermittent illumination, by pressing the reflector 23 axially towards the lamp body, thereby bringing the rim 26 of the reflector into contact with the open end of the extension 14 as seen in Fig. 3; it will be sufficient to tilt the reflector, as by pressure at one point of the collar 31, in order to establish the circuit, which will be interrupted as soon as such pressure is removed. By further rotary movement of the collar and reflector 23, each of the contact arms 36 may be brought into the position shown in Fig. 4, where the arm is engaged between the two cheeks 21, 22 of the insulating pad, all three arms 36 being similarly engaged in their insulating pads, in this position, therefore, the lamp is positively locked out of operation, and no axial or tilting pressure will serve to close the circuit, the locked position being therefore advantageous in cases where the lamp has to be stowed with possibility of axial or tilting movement or end pressure.

The base portion 35 of the reflector or lamp body is shown provided with an insulating sheath 38 to obviate risk of accidental closure of the circuit by contact between this base and the interior of the carrier ring 17 which is in conductive connection with the casing or body.

With the reverse direction of rotation, the arms 36 will be brought from the locked position (Fig. 4) between the cheeks of their insulating pads, first into the open-circuit posi-

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tion (Fig. 2) where they press against the longer cheeks 21 of the pads, and secondly by further rotation into the closed-circuit position (Fig. 1) where they press against the carrier ring 17 and thus cause the illumination of the lamp. By still further rotation, the contact arms may be lifted over the walls 20 and brought into alignment with the gaps 18 between the ledges 19 of the carrier ring; in this position they will allow the reflector or lamp head 23 to be withdrawn from the lamp body, together with the rubber cap 31, for example if required to replace the battery or batteries 11 or the lamp bulb 25.

Due to the tight engagement of the collar flange 32 with the exterior of the extension 14, axial movement of the reflector 23 in relation to the lamp body for intermittent illumination may be resisted by slight compression of the enclosed air, but this can be relieved by displacement of air from the interior into the thin flange 32, which expands to form a bulge 39, as indicated in Fig. 3, without affecting the tightness of the closure effected by the cylindrical head 33, which can roll in place. It will be understood that on the axial return of the reflector to its normal position, the displaced volume of air can leave the bulge 39 in the flange and re-enter the lamp body.

During the fitting of the collar 31 and lamp head 23, the air enclosed in the lamp body will similarly be subject to a slight compression, which can be accommodated by the bulge in the flange until the pressure falls again, when the contact arms 36 are in their normal position; upon removal of the rubber collar, appreciable suction may occur within the lamp body, resulting in a rather sudden release of the collar and the possible jerking of the batteries 11 out of the casing; this may be avoided by the provision of small vent holes as shown at 40, sufficient to reduce the vacuum gradually as the collar is pulled off.

In addition to the contact members 34, 36, the reflector also carries a contact member consisting of a soft metal stud or rivet 41 normally interposed between the centre pole of the lamp bulb 25 and the centre pole of the adjacent battery 11, in order to avoid wear at the lamp contact, due to tilting or rotary movement of the reflector, and possible unscrewing of the lamp bulb, due to the rotary switching movement. This contact member or stud 41 is carried by a plate 42 made of insulating material such as fibre, secured upon the base 35 of the reflector, so that the stud turns to and fro together with the reflector and lamp bulb.

The improved battery lamp is substantially water-proof and also proof against gas, flame and dust, so that it is particularly suitable for use in mines and other places where there is danger of explosion caused by sparks at electrical contacts; in order to prevent un-

authorised removal of the resilient rubber cap 31 and consequent opening up of the lamp under such circumstances, means may be provided for locking the cap in position, while allowing its rotary movement. For example, as shown in Fig. 12, there may be fitted over the head of the lamp a safety ring 43, made in two halves locked together in position by screws 44, of a suitable type which requires a special key or spanner for their release; provision may also be made for a sealing wire to prevent the removal of the safety ring.

The lamp body or casing 10, the inserted carrier ring 17, the reflector or lamp-head 23 and the contact member 34 may be manufactured as mouldings, castings, stampings or spinings of sheet metal; it will be understood that the invention is not limited to the particular embodiment described and illustrated, but may be modified to suit various conditions of use, within the scope of the appended claims.

WHAT WE CLAIM IS:—

1. An improved electric battery lamp in which a bulb-holding reflector or lamp head, partially rotatable in relation to the battery casing by means of a cap or collar to effect switching of the lamp circuit, is also movable axially or by tilting in relation to the casing in order to provide for intermittent illumination of the lamp, by bringing the rim of the reflector into contact with the open end of the casing.

2. A battery lamp according to claim 1, in which there is provided an additional position in the rotary movement of the reflector, at which position it will be locked against axial movement.

3. A battery lamp according to claim 1, in which a resilient cap or collar fitted around the open end of the lamp casing, is formed with an integral flange, this flange being expandable to accommodate air displaced from the interior of the lamp casing by the axial movement of the reflector to provide for intermittent illumination.

4. A battery lamp according to claim 3, in which the flange comprises a thin portion of substantially cylindrical shape, normally fitting around the open end of the casing but expandable by bulging outwards to accommodate displaced air, and a terminal head slightly smaller in diameter than the open end of the casing.

5. A battery lamp according to claim 1, in which the battery casing has a flared open end providing a cylindrical extension of larger diameter, into which there is fitted a metal ring having an inner flange divided so as to form three arcuate ledges, insulating pads associated with these ledges being engageable by three contact arms projecting from the rotatable reflector, and these contact arms being adapted to engage with the respective ledges in the closed switching position.

6. A battery lamp according to claims 2

liable to suck in water if the lamp is submerged, or to draw in damp air at other times.

5 The present invention has for its main object to prevent such escape of air and consequent partial vacuum, even to the extent of retaining a slight pressure of air inside the lamp, so as to eliminate the risk of water or damp being introduced into the lamp.

10 According to the invention, the ring or collar is provided not only with its partial extension over the front cover of the lamp, but also with a bead or rim at its opposite end, this bead or rim being preferably circular in

15 cross-section and being smaller in diameter than the cylindrical extension of the casing so as to grip tightly thereon, and the intermediate portion of the collar is expansible so as to accommodate the volume of air displaced from the interior of the casing by the axial movement of the reflector in relation thereto, whether in the fitting of the resilient collar or in the intermittent switching on. Thus the air

20 escaping from the interior will force its way

into the space afforded by the intermediate portion of the collar rising from the cylindrical extension as it expands, and on the return movement this air will pass back into the interior of the lamp, there being substantially no change of internal pressure and no subsequent partial vacuum until the resilient collar is drawn off for inspection or replacement of the bulb or battery.

The intermediate portion of the collar may rest normally against the cylindrical extension, its rise from the latter causing the circular-section bead or rim on the extension while still giving a positive seal at this point; under exterior pressure, the intermediate portion will be pressed tightly inwards against the cylindrical extension, thus improving the seal against external pressure, for example when the lamp is submerged.

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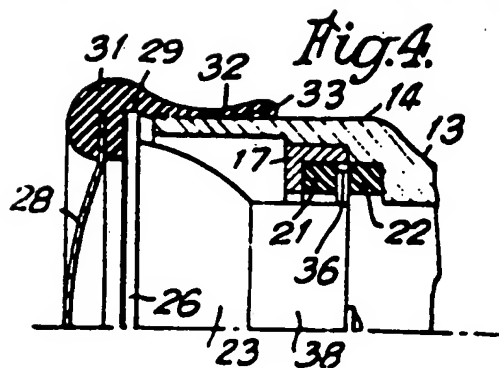
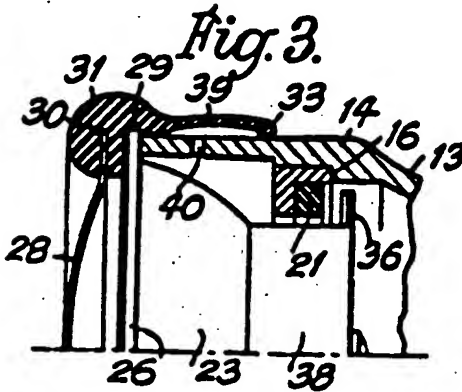
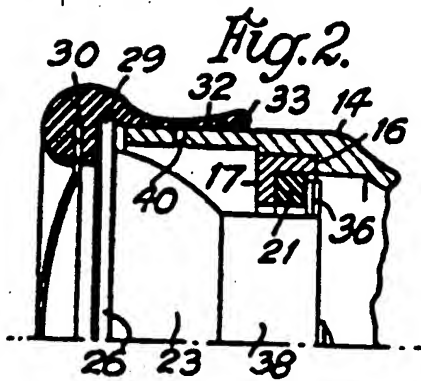
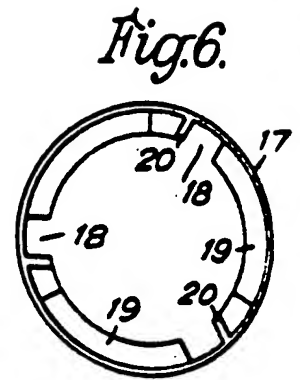
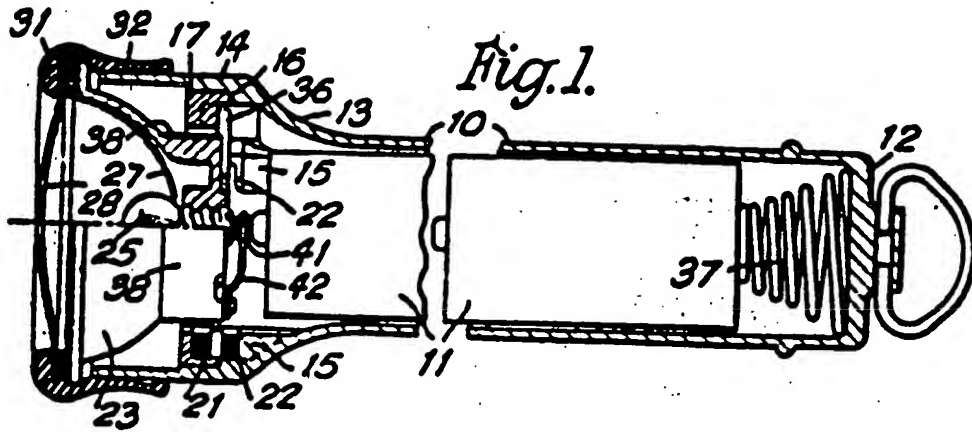
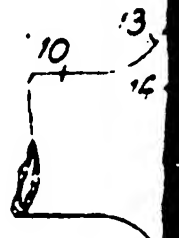
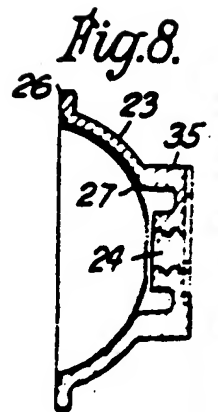


Fig. 3



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able to suck in water if the lamp is submerged, or to draw in damp air at other times.

The present invention has for its main object to prevent such escape of air and consequent partial vacuum, even to the extent of retaining a slight pressure of air inside the lamp, so as to eliminate the risk of water or damp being introduced into the lamp.

According to the invention, the ring or collar is provided not only with its partial extension over the front cover of the lamp, but also with a bead or rim at its opposite end, this bead or rim being preferably circular in cross-section and being smaller in diameter than the cylindrical extension of the casing so as to grip tightly thereon, and the intermediate portion of the collar is expansible so as to accommodate the volume of air displaced from the interior of the casing by the axial movement of the reflector in relation thereto, whether in the fitting of the resilient collar or in the intermittent switching on. Thus the air escaping from the interior will force its way

into the space afforded by the intermediate portion of the collar rising from the cylindrical extension as it expands, and on the return movement this air will pass back into the interior of the lamp, there being substantially no change of internal pressure and no subsequent partial vacuum until the resilient collar is drawn off for inspection or replacement of the bulb or battery.

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2 SHEETS

COMPLETE SPECIFICATION

This drawing is a reproduction of
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SHEETS 1 & 2

Fig. 6.

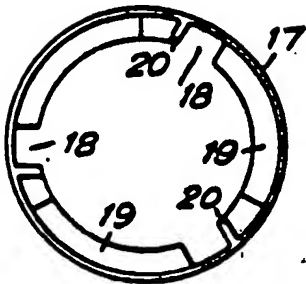


Fig. 7.



Fig. 5.

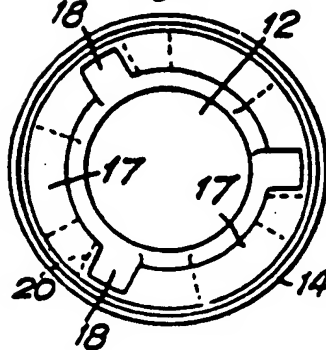


Fig. 8.

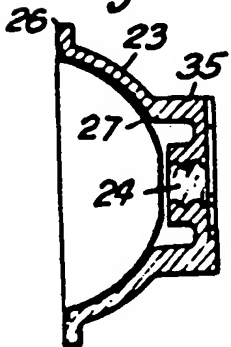


Fig. 9.

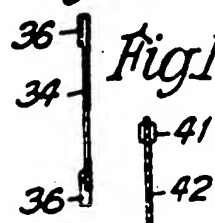


Fig. 10.



Fig. 11.

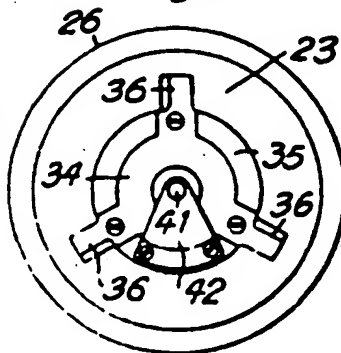
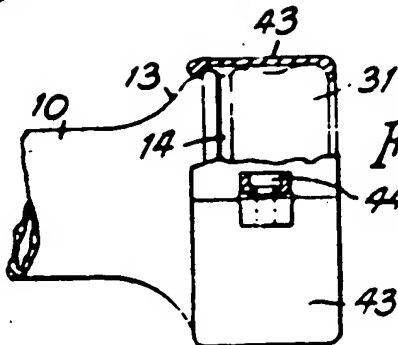


Fig. 12.



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